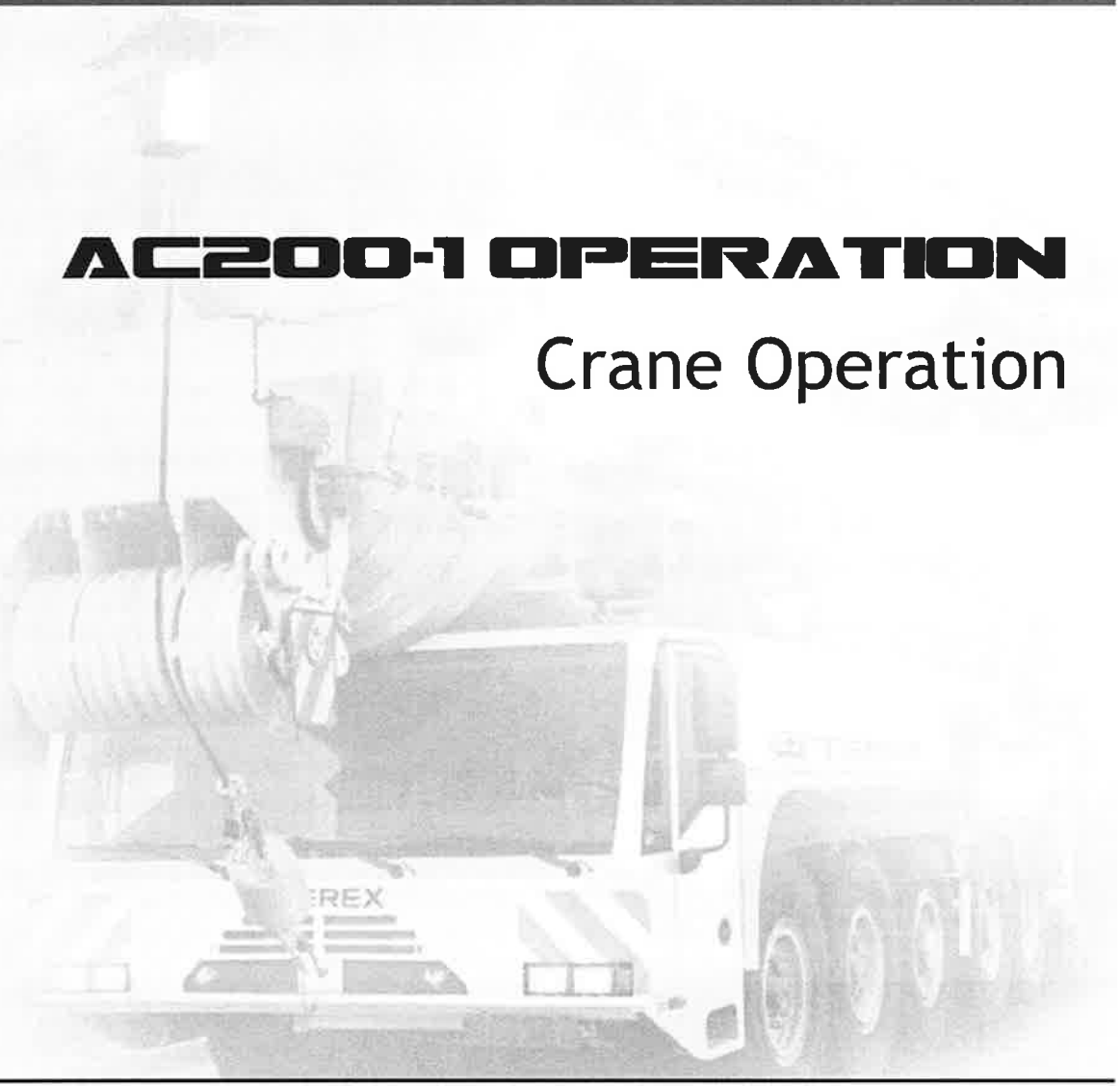
TEREX®

GLOBAL CRANE TRAINING

AC200-1 OPERATION

Crane Operation



Crane Operation Content

Permitted wind speeds

With all crane configurations, the boom system may only be erected when the expected wind speeds (weather forecast) are also permissible for operating the crane.

Observe the permissible wind speed.

Wind speed	Procedure
Up to 9.8 m/s (35 km/h)	Crane operation does not need to be restricted.
Over 9.8 m/s (35 km/h)	Cease working with the crane
15 m/s and above (54 km/h)	Telescope the main boom in, the main boom extension can remain in the operating position. As far as possible, position the boom system into the wind.
20 m/s and above (72 km/h)	Set the main boom system in transport position.

The applicable national regulations must also be adhered to.

It is part of the planning for every operation that an enquiry is made at the meteorological office responsible for forecasting wind conditions.

In any case, pay attention to the information in the lifting capacity tables, as there can, under certain circumstances, be reductions in the permitted wind speeds.

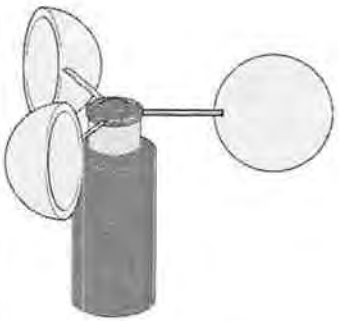
To enable the wind speed to be determined precisely, the crane may be fitted with an air speed indicator (anemometer).

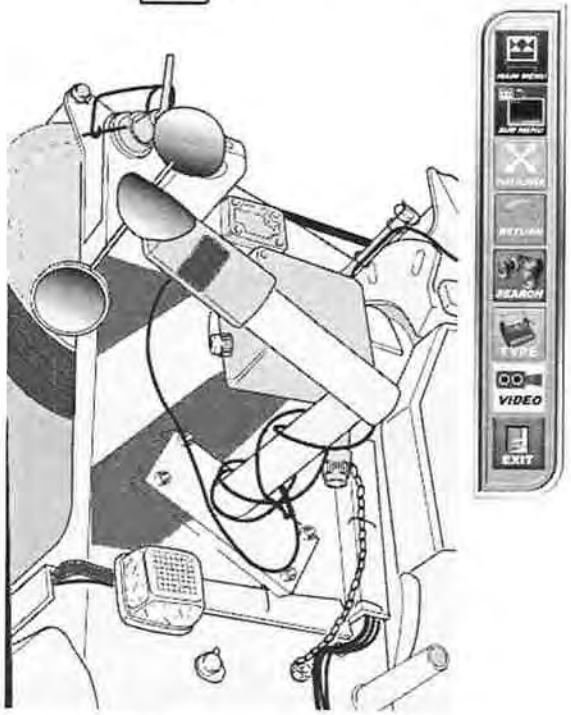
The rotor, secured to the head of the main boom or main boom extension;

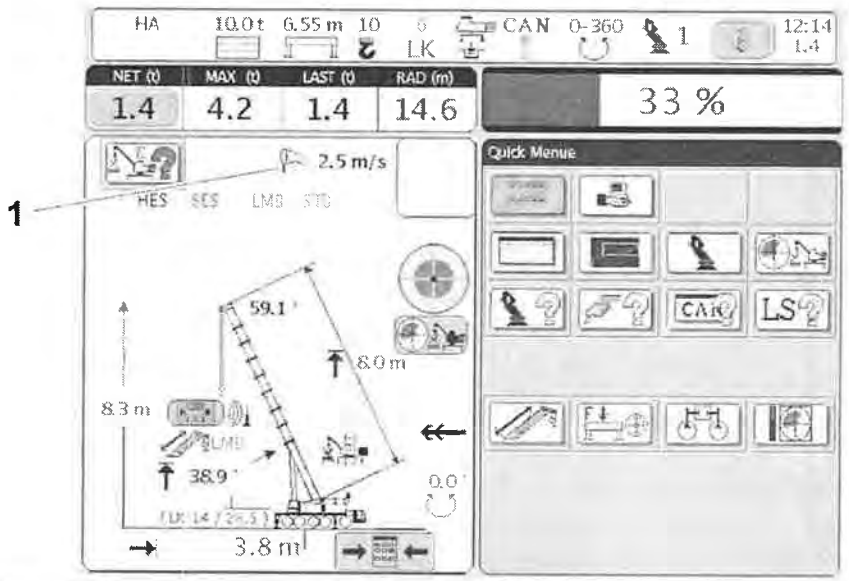
You can read the wind speed (**1) in m/s at the display of the** LLD.

If the crane is to be switched off for longer periods, e. g. at

night, without supervision, the main boom must be retracted. If winds stronger than 20 m/s are expected, set the boom system in transport position.







Wind speed and dynamic pressure

The dynamic pressure is calculated as:

$q = v^2 / 1.6$ v = wind speed in [m/s]

q= dynamic pressure [N/m2]

The resulting wind force is calculated as:

$F_w = c_w \times q \times A$ A = surface area of load exposed to wind

c_w = coefficient of wind resistance

Crane in the wind with load

Unless otherwise specified in the tables, the following parameters are assumed for the lifting capacities:

Wind speed	v = 9.8 m/s
Dynamic pressure	$q = 9.8^2 / 1.6 = 60$ N/m²
Surface area of load exposed	A = 1.0 m² per ton to wind Lifting capacity, however at least 2 m²
Coefficient of wind resistance	$c_w = 1.2$

Example: Lifting capacity = 20 t

A = 20 m^2

The resulting wind force on the load is then calculated as:

$F_w = c_w \times q \times A = 1.2 \times 60 \times 20.0 = 1440$ N

Caution: The coefficient of wind resistance c_w is *not* a constant. The loads can also have different c_w values.

c_w values can, for example be taken from DIN 1055 / part 5.

With the exception of crane operation with the main boom extension, wind speeds of up to 15.5 m/s (dynamic pressure 150 N/m^2) are permitted if the surface area of the load exposed to the wind or the lifting capacity is reduced in accordance with the above-mentioned values.

Example 1: Lifting capacity = 20 t

Hoist load = 10 t

Assumption: A = 10 m^2

The permitted dynamic pressure is calculated by adjusting the formula as: $q = F_w / (c_w \times A) = 1440 / (1.2 \times 10) = 120$ N/m^2

The permitted wind speed then equals:

$q = v^2 / 1{,}6 \rightarrow v = \sqrt{q \times 1{,}6}$ $\quad v = \sqrt{120 \times 1{,}6} = 13{,}9$ m/s ≤ 15,5 m/s

Example 2: Lifting capacity = 20 t

Hoist load = 10 t

Here, however, the following values are

known: A = 5 m^2

c_w value = 1.5

The permitted dynamic pressure is calculated by adjusting the formula as:

$q = F_w / (c_w \times A) = 1440 / (1.5 \times 5) = 192$ N/m_2 > 150 N/m^2 !

q_{max} = 150 N/m2 must be observed.

The permitted wind speed then equals:

$q = v^2 / 1{,}6 \rightarrow v = \sqrt{q \times 1{,}6}$ $\quad v = \sqrt{150 \times 1{,}6} = 15{,}5$ m/s

For loads with a larger surface area exposed to the wind, please contact the crane manufacturer.

General notes on operation

- For main boom operation, the missing hoist limit switch for the main boom extension must be bridged by means of the blind plug (**22**).
- When operating the crane with the main boom extension:

* Plug (**8**) **for the hoist limit switch of the main boom must** be removed from the socket on the main boom head and plug (**9**) **for the hoist limit switch of the main boom** extension plugged in.
* The shift weight (**21**) **of the hoist limit switch of the main** boom must be removed.

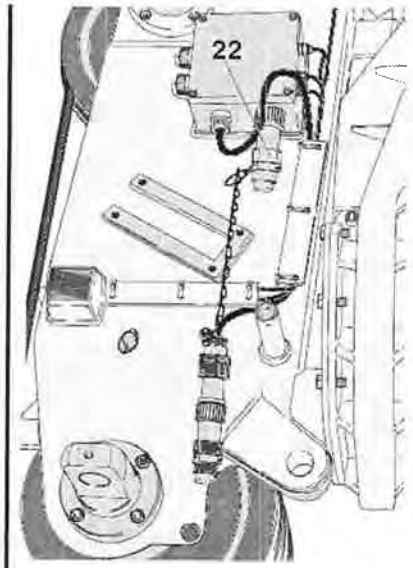
If a hoist rope has not been reeved the shift weight must be coupled to the attachment provided, so that the cable from the junction box on the main head to the cable reel is not damaged.

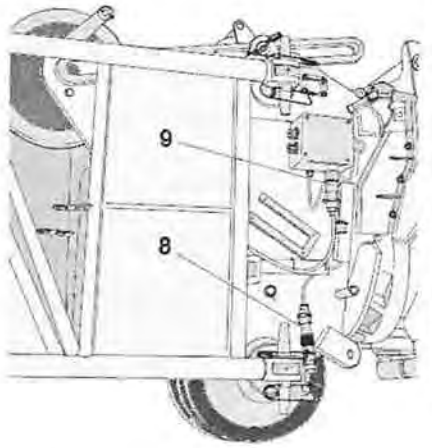
- For crane operation with the main boom extension locked in the transport position, the loads specified in the load table are reduced, i.e. the proportional weight of the main boom extension in the transport position must be added to the load that is to be lifted (see Notes on crane operation).
- Crane operation with additional equipment fitted:

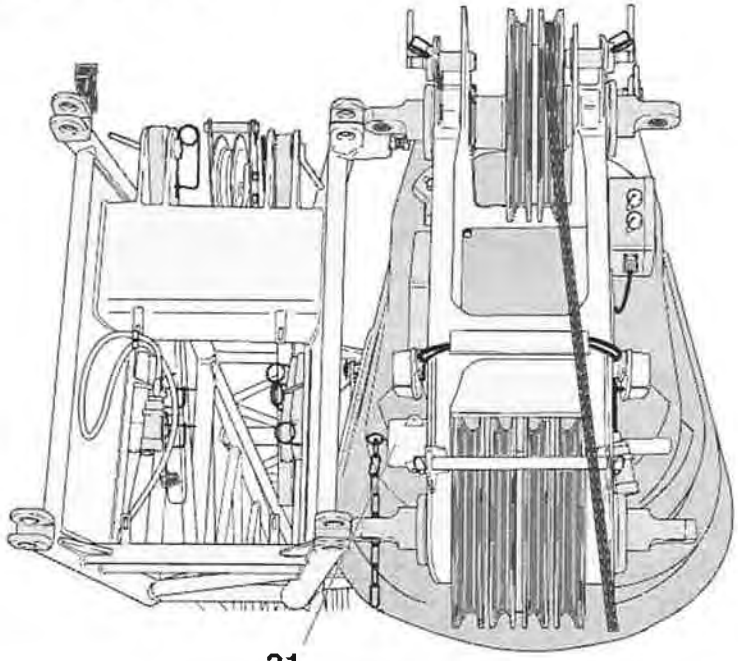
* The lifting of loads simultaneously on the main boom and the main boom extension is prohibited.
* The lifting of a load on the main boom with main boom extension with load or without load is prohibited.
* **The number of falls given in the load tables must be adhered to.**

- The crane may be operated with the main boom extension only with the crane supported on outriggers.

The lifting capacity of the crane in consideration of the main boom length and the counterweight fitted can be taken from the load tables. The axle suspension must be locked.







Raising a load using several cranes

If a load is to be raised using several cranes, the working procedure must be determined beforehand,
in particular when:

- the cranes do not have the same lifting capacities;
- the suspended load is not of uniform shape or the center of gravity is not known;
- dynamic influences are expected when releasing the load.

The load must then be raised in the presence of a supervisor.
When raising a load using several cranes, it must be ensured during raising and lowering that:

- the permissible load for each crane is not exceeded.
- the load is not damaged by excessive strain on the attachment points (fixing the crane hook to the load).
- the load is lifted at an even rate.

The permissible crane load will be exceeded or the attachment point of a load will be excessively strained if:

- a crane raises the load too quickly during the simultaneous raising of the load;
- a crane lowers the load too slowly during the simultaneous lowering of the load.

Checking the safety measures

Before work is begun, i.e before a load is lifted, the following points are to be checked:

- Crane chassis suspension system is switched to “raise axles”.
- Underlying ground is firm enough to support the weight of the crane.
- All 4 outrigger struts are extended to the support area given in the duty chart.
- Outrigger plates are secured.
- Crane is in level position.
- Crane is not situated near a ditch or sloping ground.
- All axles are without load, i.e no wheel is in contact with the ground.
- No live cables are situated within the operating radius of the crane.
- Crane is positioned such that it can be operated with a minimal operating radius.
- There are no obstructions which may restrict necessary crane movements.

- If visibility is poor or if it is dark, the immediate area in front of the cab, the outriggers and the boom must be lit using spot lights which are on the machine.

The relevant operating elements are in the crane cab:

83 (S6130) Switch Spot light superstructure, left

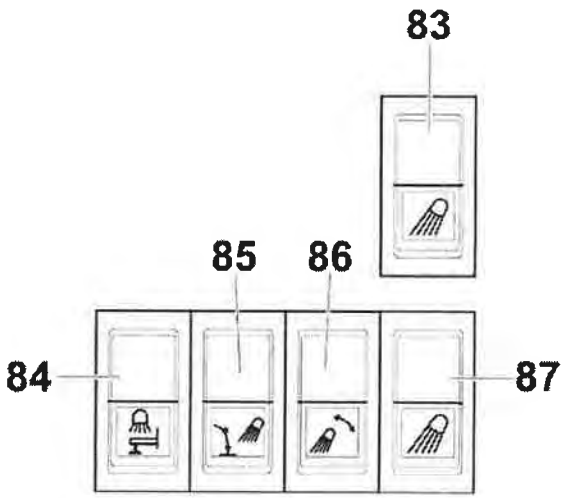
84 (S6211) Switch Spot light outriggers

85 (S6140) Switch Switch on / off spot light on main boom

86 (S6145) Double Adjust spot light on main boom button

87 (S6120) Switch Spot light superstructure, right

Other surrounding areas (load, load path, slewing range, driving path, and similar) must be lit using suitable means, independent of the crane. This is the responsibility of the crane operator.



Operating information on pilot control

Electric pilot control

The control levers have differing effects on the various crane movements.

1. Crane movements dependent on engine speed:

- Hoist up / down
- Luffing gear up
- Slew gear left / right (without any further movements)

For these crane movements, proportional valves which are dependent on engine speed are activated. This means that with the lever of the pilot control sensor (control lever) in the same position, the valves are opened wider at high than at low engine speeds.

This ensures an adequate supply to the valves.

As a result:

with the lever in the same position, movement is, for example, slower at 1200 rpm than at 2350 rpm.

2. Crane movements independent of engine speed:

- Retracting / extending telescopic sections
- Slewing gear (when the slewing gear is activated before other movements are introduced). These movements operate in accordance with a fixed control characteristic which cannot be altered by external control elements (e.g. rocker switch on control lever when operating telescopic sections).

As a result:

movement speed remains the same even if engine speed is increased (throttle opened).

3. Crane movements altered at the press of a button:

- Luffing gear down
- Hoist up / down
- Slewing gear right / left

The speed of these movements is not dependent on engine speed. In the pilot control levers there are rocker switches which can be used to vary speed manually. This device is designed to enable more sensitive operation.

When the buttons are actuated, speed is indicated (in %) on the LMB display. This also remains visible a short time after the buttons have been activated, then jumps back to the previous display mode.
When the ignition is switched on, the following values are preset for the speed:
- Luffing gear down 40 %
- Hoist up / down 100 %
- Slewing gear right / left 50 %

4. Dead man's switch (104/114)

To prevent the unintended activation of crane movements, both control levers are fitted with an additional button (dead man's switch).
A crane movement can only be carried out when one of the buttons is pressed.

5. High-range button (101/111)

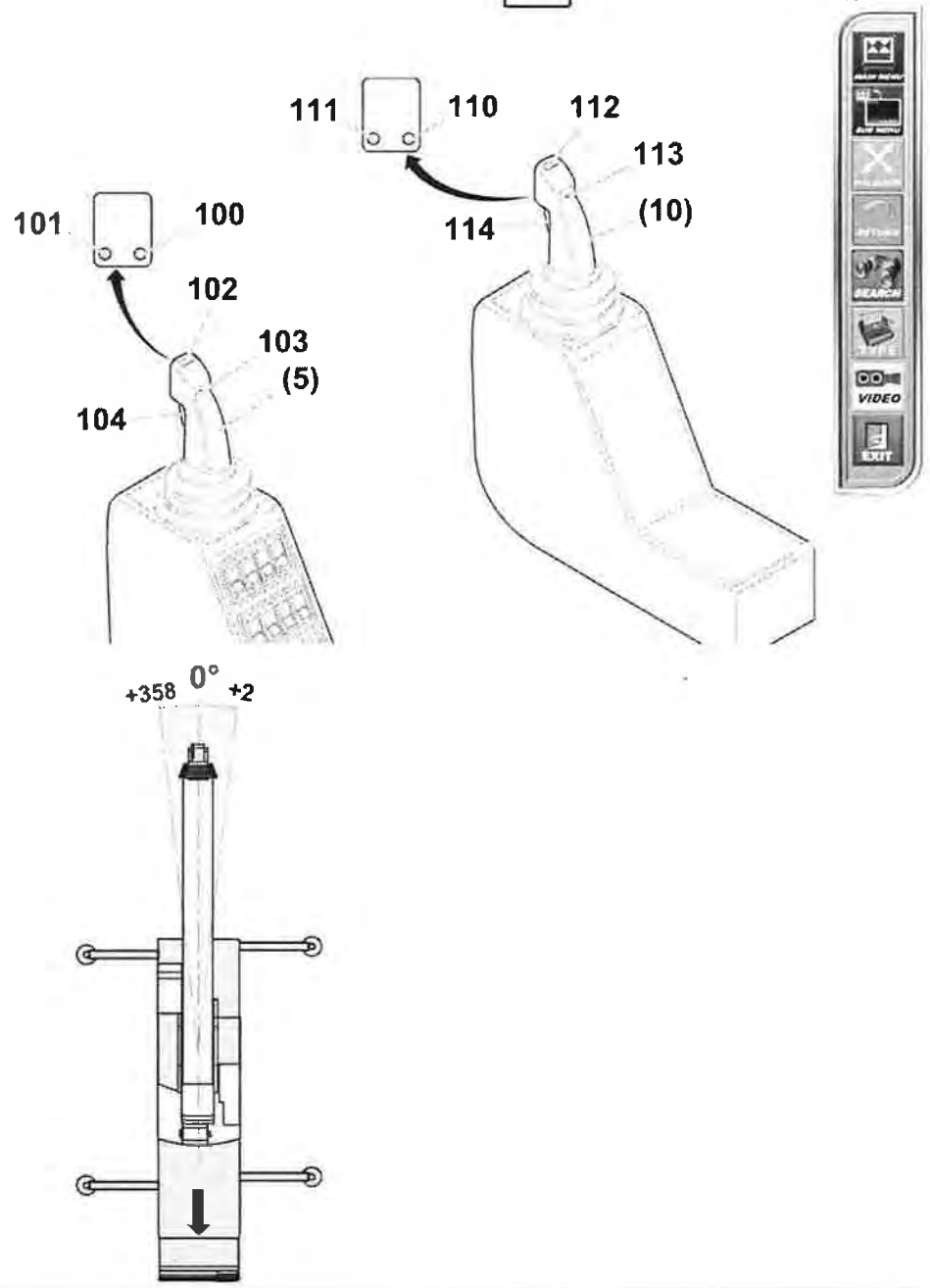
The high-range button at the left of the pilot control sensor is only active for the following:
- Hoist up / down
- Luffing gear up

i.e. crane movements dependent on engine speed.
This means that within a given speed range, the control current to the proportional valve is readjusted proportionally to the change in engine speed in the high range.

6. Using "0°- facing-rear carrier weight tables"

Prerequisites:
- Position superstructure in the angle range from +2° or +358°

Select in the operating-mode pre-selection mask type "HA-0".
The "0°-facing-rear carrier weight tables" can only be selected for the above-mentioned prerequisites.



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